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Fig. III. Aliud animal in iisdem corallinis repertum.

A. illud animal pronum.

B. supinum.

C. fortiore microscopio visum.

Fig. 1, 2, 3, 4, 5, 6, 7, 8. exhibent quasdam noctilucas, et alia animalcula in diversis corallinis reperta, ea magnitudine, qua tertia et quarta lens microscopii à Do. Cuff in Anglia fabrefacti illa ostendit.

Animalculum c, fig. 8. mirabilissimæ erant structuræ, et plurima habebat membra.

XXXIII. *Remarks on Dr. Job Bafter's Observations de Corallinis, &c. printed above, p. 258. In a Letter to the Right Honourable George Earl of Macclesfield, President of the R. S. from Mr. John Ellis, F. R. S.*

My Lord,

Read June 9.
1757.

I HAVE read Dr. Job Bafter's letter to the Royal Society; wherein he endeavours to prove, that corallines are not of an animal, but a vegetable nature; and has brought many arguments to support his system; which, to gentlemen not well acquainted with the subject, may appear plausible.

I could have wished the Doctor had read and examined thoroughly what has been lately written on the subject: I then should not have had occasion
to

to trouble your Lordship with the following remarks, which I find necessary to support what I have already advanced on that head.

His first argument is, That because he does not find as many polypes in the corallines adhering to ships, flood-gates, and buoys, as in deep water on oysters, muscles, and rocks, therefore he concludes, that corallines are not formed by polypes.

In answer to this, let us examine the pliable structure of these bodies, and how wisely nature has defended such tender substances with a tough thin membranaceous covering, and we shall find, that the sea is calm enough often near the surface to give them time to grow, even in the strongest currents: but, without doubt, they are more liable to be destroyed in such agitated situations, than in the calm depths of the sea.

His second argument is, That finding polypes are not equally dispersed over the whole plant, how can they form it? and gives us an example, *Tab. VIII. fig. 5.* of a coralline, that is incrusted with many other corallines or polypes on the stem, but has none on the branches.

Here we plainly see the mistake: the Doctor looks for the tender part of the polype on the surface of the coralline, considering it as a plant; and indeed, if this was the case, he ought so to do; but he never once takes notice of the internal hollow structure of the stem, branches, and denticles of those bodies, to inform us, whether he found an animal in those parts or no. This material point he seems not to have thought on; which is really the true point in controversy at present among gentlemen, who have not examined these bodies recent in sea-water.

His third argument is, That almost always one and the same coralline plant cherishes polypes of different kinds; and refers us to Tab. VIII. fig. 2. and 4.

In fig. 2. he gives us an elegant painting of a geniculated red conferva for a coralline, surrounded, as is very common, by many species of small corallines and escharas. And in fig. 4. he gives us a drawing of one of the tubular corallines, with the head of the animal at the top of it; the stem of this is incrufted with four different corallines and escharas, like the conferva fig. 2; and then he asks, which of these five polypes made the tubular coralline?

To give him some proof of the animal nature of this coralline, let him consult Ray's Synopsis, ed. 3. p. 34. n. 4. and there he will find one of this species, called *adianti aurei minimi facie planta marina*, taken notice of so long ago as the year 1713. by Dr. Lloyd, as a zoophyte, from its stem or tube's being full of a thick reddish liquor, rather resembling blood than the juice of a plant; which, upon pressing the stem, communicated with the little head at top.

His fourth argument is, That as upon one and the same coralline plant you shall find different kind of polypes; so, in different species of coralline, the same polypes: and, to confirm this, he quotes my Essay on Corallines; where I have remarked, that the polypes in the denticles of the setaceous or bristly coralline, N^o. 16. appear to be like those, that are on the lobster's-horn coralline, N^o. 19. And to illustrate this, he observes, that bees and wasps always build their cells invariably the same; and that therefore these two corallines should be the same.

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But herein he takes this matter wrong: he has considered, in all his observations, the heads of those parts of the polype, in which are the mouths, arms, or tentacula, which appear coming out of the cups, denticles, and at the ends of the tubes of the corallines, as so many whole and intire animals, without ever observing, that the body of the animal is contained in the tubular part of the root, stem, and branches; and that these differ from one another widely both in size and shape, as he may plainly see in the two corallines he has instanced: for the more exact drawings of which, I shall refer him, *viz.* for the setaceous or bristly coralline, to my Plate, N^o. 38. the natural size of which is at fig. 4. and the magnified one at fig. D: this he will observe to have a small stem, and its branches disposed in a pinnated form: and for the lobster's-horn coralline, I shall refer him to Tab. xxii. of Vol. xlviii. of the Philosophical Transactions; where, at N^o. 3. the natural size is expressed, and at C the upper part of this coralline is drawn in proportion to the bristly coralline from the same magnifying glass; which shews the stem to be much larger, and surrounded by its branches growing in whorles at equal distances, not unlike the equisetum, or horse-tail plant; and yet the heads of this animal nearly resemble the other, only a little larger. Further, his comparison to bees and wasps, and their cells, is not conclusive: for these ramified, hollow, and denticulated bodies, called corallines, which we so frequently find dead on our shores, are properly skins of certain marine polypes, and not nests, as those constructed by these little winged animals are. And yet we find as great a

regularity in the same species of these corallines, as when we compare two oak trees to one another, or two of Mr. Trembley's branched fresh-water polypes to one another.

He then proceeds to his fifth argument, That if corallines were formed by polypes, neither the polypes, nor even their cells, would ever fix on living animals, or any other bodies.

Here we may observe, that the consequence he draws doth not follow: for corallines may be formed or produced by certain species of polypes, and yet polypes of another species may be found adhering to other bodies, and even to animal bodies.

By his sixth argument he endeavours to prove, That the vesicles, which are found in regular rows on the sea-fir coralline in winter, Tab. VIII. fig. 6. do not belong to it; and are no more than the eggs of some sea insect deposited on it, of which there may be a great variety.

But to convince him of his mistake, let him take off one of the vesicles, and apply a large magnifier to the place, and he will discover a hole, by which this vesicle or ovary has had a communication thro' the skin with the parent polype. For a further illustration of the manner in which these vesiculated polypes breed, let him consult the 38th Plate of my Essay, where he will find several accurate figures (drawn by Mr. Ehret from the life) of these vesicles, with the spawn of the polypes coming out of them; some of which spawn we evidently discovered to be young polypes with their arms formed; and, as they fell from the vesicle, extending themselves in the watch-glass of sea-water.

In

In examining the drawings for his plates, I have observed, that Tab. VII. fig. 2. is evidently a red conferva, which he calls a coralline. We have no corallines, but many confervas, of this form and bright red colour on our coasts; and these shores, I believe, are allowed to have similar marine productions with those of Holland.

Tab. VII. fig. 5. he calls a branch of red coralline, which he says he kept several weeks in sea-water, and that often changed; during which time it sprouted and grew very much. This experiment, I am persuaded, is very true; because it is plainly a vegetable, as appears from his own exact drawing of it; and seems to be the *fucus teres rubens minus in longum protensus* of Ray's Synopsis, ed. 3. p. 51. N. 53. This is one of his principal arguments to prove the vegetation of corallines.

Tab. VIII. fig. 1. he calls a branch of red coralline; and at fig. 2. he has it magnified, where it appears to be a geniculated red conferva, drawn and painted with great exactness.

These arguments, my Lord, and these figures of real vegetables, which the Doctor has given us for corallines, shew, how much he is willing to support the old opinion of the botanists: but I am satisfied he will soon alter his opinion, when he observes the remarkable difference of the texture of vegetable and coralline bodies, when viewed in sea-water thro' a good aquatic microscope. And to convince him more fully, that corallines are an animal substance, let him burn them, and he will perceive the same pungent volatile alkaline smell, which he finds in
burning.

burning horn, hair, or oysters ; whereas burnt fucus's and confervas yield a smell not much unlike that of common land vegetables. Even the stony corallines, when their cretaceous covering has been dissolved in vinegar, the membranous part, that remains of them, put into the fire, yields the same animal smell with other corallines.

Further, since I find the Doctor has promised the Royal Society to continue his researches at the sea-side, the following hints may be of use to him. And, first, he will find, that those he seems to think naked polypes, which he found adhering to corallines and other bodies, are really small corallines and escharas, with their proper skins and cells ; all which I have particularly described already. I would then recommend him to examine such corallines as are taken out of the deepest water, which are found adhering to shells and fucus's. He will find Mr. Cuff's aquatic microscope, or one of that form, the most commodious for observing these animals alive.

The most transparent ones he will find the best to discover their gelatinous inside, which runs thro' the stem and ramifications, and ends in the heads, where the claws are. Some of the best kinds to observe are as follows : The sea-oak coralline, the lily-flowering coralline, the great tooth coralline, the sea-thread coralline, and the branched tubular coralline. Pieces of these should be cut off while they are in the sea water, and placed in watch-glasses full of the same : in these they should remain a while, till they recover themselves ; and when they are placed on the stage of the microscope, the motion of the internal part communicating with the heads will be easily discovered.

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If the Doctor will immerse some of these coral-lines, when they are extended, in two thirds of spirit of wine and one third of clear sea-water, it will preserve them many years, as I have experienced. He may then put the different sorts into distinct phials, and view them at pleasure with a lens of about one inch and half focus.

In fine, my Lord, opportunities so seldom offer at the sea-side to make these experiments with accuracy; add likewise to this, the strong lines of vegetation that these bodies carry in their appearance, and your Lordship will not be surpris'd, that there are so many gentlemen, even of the Royal Society, that totally disbelieve them to be animals.

Many there are in the Society, that are wavering between both opinions. If then, my Lord, you think, that any specimens which I have, or any demonstrations tending to clear up this point, that lie in my power, will be acceptable to your Lordship and the Society, your Lordship may freely command them, whenever you think proper, from

Y^{our} L^{ORDSHIP'S}

Much obliged and most obedient Servant,

London,
June 9. 1757.

John Ellis.